

Drawings:

Amend FIG. 1 as shown in the attached sheet of revised drawings.

REMARKS

In the Final Office Action dated February 14, 2006, the Examiner maintained the species election requirement stating that Figures 1-4 do not show an elbow. Applicant had directed the Examiner's attention to the specification at paragraph 34 which describes the use of an elbow in the arrangement illustrated in Figure 1. Such an arrangement is illustrated in FIG. 5, however, the elbow had not specifically been illustrated in FIG. 1, even though paragraph 34 discusses the use of an elbow in connection with the arrangement shown in FIG. 1. By the present amendment, applicant has amended the drawings to illustrate the elbow 64 in FIG. 1, along with the turbulence reducing device 60, as those items are discussed in paragraph 34. Paragraph 34 has also been amended, only to insert reference numerals into the text for the elbow 64 and the turbulence reducing device 60. No new matter has been introduced into the specification or drawings. In view of this amendment, applicant requests the Examiner to reconsider and withdraw the species election requirement, and to reinstate withdrawn claims 24 - 26.

Claims 1, 2, 4-8, 10-12, 14 and 15 were rejected under 35 USC §103(a) as being unpatentable over McCall in view of Richter and Kozyuk. Claims 3 and 9 were rejected under 35 USC §103(a) as being unpatentable over McCall in view of Richter and Kozyuk and further in view of Rosecrans. Claim 13 was rejected under 35 USC §103(a) as being unpatentable over McCall in view of Richter and Kozyuk and further in view of Arnaudeau. Claims 16 and 20-22 were rejected under 35 USC §103(a) as being unpatentable over McCall in view of Kozyuk. Claims 17 and 19 were rejected under 35 USC §103(a) as being unpatentable over McCall in view of Kozyuk and further in view of Richter. Claim 18 was rejected under 35 USC §103(a) as being unpatentable over McCall in view Kozyuk and further in view of Rosecrans.

A declaration of the inventor, James Richter, identifying evidence of secondary considerations of non-obviousness is submitted herewith, and is discussed at the conclusion of this Remarks section.

McCall discloses a device for measuring fluid flow, particularly for testing fire hydrants. Flow straightening vanes 36, 38 are positioned upstream and downstream of a flow conditioning means 30 in order to reduce or eliminate swirl and to provide a stabilized flow to a flow meter 40 in the form of a propeller. Pressurized water is introduced to the device, either from a fire hydrant, water pump or from a fire hose, and the water leaving the device is directed into a fire hose. No mention or concern about a downstream fluid control device is disclosed or contemplated in McCall. The intended purpose of the McCall device is to provide "highly reliable measurements" of the fluid flow in a conduit.

Richter discloses a flexible connector for use with a fluid conduit, formed of an elastomeric material, to absorb shock, vibration and alignment in pipelines. No flow straightening or conditioning features are mentioned or contemplated in the Richter disclosure.

Kozyuk discloses a device for conducting sonochemical reactions by severely constricting flow in a conduit to create cavitation of the liquid, and subsequent collapsing of the cavitation bubbles. Kozyuk is not concerned with stabilizing fluid flow, reducing turbulence or straightening fluid flow in a conduit. Kozyuk does disclose the use of a valve 150 as a means of controlling local hydraulic resistance and elevating the static pressure in the flow at the outlet 103 to control conditions for the progress of chemical reactions. No flow straightening or conditioning features are mentioned or contemplated in the Kozyuk disclosure.

Rosecrans discloses a hose having resistance to high temperature, flexing, high pressure and chemical corrosion, and includes an elastomer inner tube 40 reinforced by a braided sheath 42. The braid is covered by an intermediate elastomer tube 44 which is reinforced by a braided sheath 46. An outer tube 48 encompasses the sheath and is enclosed within a braided reinforcing cover. The braided sheathes and covers may be made of polyester or wire depending on the pressure requirements of the particular hose. No flow straightening or conditioning features are mentioned or contemplated in the Rosecrans disclosure.

Arnaudeau discloses a pumping device for diphasic fluids. A flow straightener section is disclosed comprising at least two fins projecting into the fluid flow path downstream from the impeller. The fins are described as being “thick” in the hydrodynamic sense of the adjective.

Every prior art flow straightening device located by the Examiner, including the one taught by McCall, is located in a rigid pipe structure, which rigid structures are incapable of absorbing at least one of shock, vibration and alignment in the conduit. In fact, rigid pipe structures transmit shock and vibration and must remain in alignment or damage occurs to the conduit. The Examiner asserts that rigid structures, such as that disclosed in McCall inherently absorb shock, since they do function, however, the Examiner does not provide any basis for this conclusion, rather than the more likely conclusion that such devices are constructed to not fail in the presence of such shock, and transmit that shock to other portions of the system, in stead of absorbing the shock.

The Examiner has merely pointed to the teachings of Richter ‘321 for a structure used in a pipeline that is capable of absorbing at least one of shock, vibration and alignment. However, the Examiner provides no suggestion in either reference to make the combination now made by the Examiner, solely with the benefit of hindsight. The Examiner states that it would be obvious to use the flexible material of Richter in the McCall device, in order to provide “a greater acoustical impedance.” Applicant is unaware of where this reference to “a greater acoustical impedance” comes from, or why it would be obvious to combine the two references to achieve this “greater acoustical impedance” or why having a “greater acoustical impedance” would be desirable.

As explained in the previous response, the McCall device is concerned with making “highly reliable” measurements of the fluid and fluid flow in a conduit. By the Examiner’s modification of McCall to utilize a flexible material for making the conduit, rather than a rigid material, would destroy the ability to provide the “highly reliable” measurements that the McCall structure was specifically designed to provide. “If proposed modification would render

the prior art invention being modified unsatisfactory for its intended purpose, then there is no suggestion or motivation to make the proposed modification. *In re Gordon*, 733 F.2d 900, 221 USPQ 1125 (Fed. Cir. 1984).” MPEP 2143.01 V at page 2100-013.

Applicant submits that the Examiner’s combination of McCall and Richter ‘321 is improper and does not render independent claims 1 or 6 obvious.

Kozyuk is relied on by the Examiner for the teaching of providing a valve in a pipeline. Kozyuk is not concerned with either the laminar condition of the flow through the pipeline or the absorption of shock, vibration or alignment in the pipeline. Therefore, Kozyuk does not provide any of the missing teachings, nor does it provide the suggestion to combine any teachings from McCall and Richter ‘321.

Since the Examiner has not demonstrated that it would have been obvious to provide the claimed combination, which includes a flow straightening device and a conduit section constructed of a flexible material to absorb at least one of shock, vibration and alignment, applicant respectfully submits that claims 1 and 6 are allowable as now presented, and requests the Examiner to reconsider the rejection and to indicate that independent claims 1 and 6 are allowable.

With independent claims 1 and 6 being allowable, each of their dependent claims are also allowable, which comprise claims 2-5 and 7-15.

In addition, and specifically with regard to claims 5 and 15, which further require that the fluid conduit section have a length less than 5 times the diameter, the Examiner has selected only a portion (one half) of the length of the disclosed conduit 10 described by McCall. The middle of this length, being the mating flanges 16, 18, connect the two halves of the enlarged conduit together. The Examiner apparently proposes to place the valve taught by Kozyuk between the mating flanges. This, of course, would completely destroy the ability of McCall to make the “highly reliable” measurements that the McCall structure was specifically designed to provide. Since this modification would render the McCall invention unsatisfactory for its

intended purpose, then there is no suggestion or motivation to make the proposed modification. *In re Gordon, supra*. The Examiner states that he is not using the measurement portion of McCall and therefore the reference is not destroyed. This statement demonstrates that the reference in fact is destroyed in that McCall is all about the measurement portion, and to remove that portion from the base reference does destroy the base reference for its intended purpose and is not permitted in an obviousness rejection.

Claims 3 and 9 are rejected with further reference to Rosecrans in addition to the combination used to render claims 1 and 6 obvious. The deficiency of the rejection of claims 1 and 6 is described above, and for that reason, the rejection of claims 3 and 9 should also be withdrawn. Further, the Examiner relies on Rosecrans only for the teaching of using a flexible metal hose for the claimed conduit section. However, Rosecrans provides no teaching or suggestion of utilizing a flow straightening device in combination with a flexible metal hose, and thus suffers the same limitations as the teachings of Richter '321, described above, in this regard. Therefore, these claims should be indicated as being allowed as well.

Claim 13 is rejected with further reference to Arnaudeau in addition to the combination used to render claim 11 obvious. The deficiency of the rejection of claim 11 (depending from claim 6) is described above, and for that reason, the rejection of claim 13 should also be withdrawn. Further, the Examiner relies on Arnaudeau only for the teaching of using which states: "The flow straightener may have 'thick' fins in the hydrodynamic sense of this adjective." Such a statement certainly does not overcome the deficiencies noted above relative to the combination of claim 11, and applicant submits that this vague statement, which is not otherwise depicted or explained, does not teach a person of ordinary skill in the art to provide fins with a hydrodynamic shape as defined in claim 13. The Examiner states that he is unaware of what applicant means by the term "hydrodynamic shape." This term is defined in the specification, at paragraph 32 as "a shape which further assists in the transition from turbulent flow towards laminar flow such that the edges of the vanes are formed of soft or gentle curves

without abrupt changes in direction.” Having the fins merely be “thick” does not fall within this definition.

Claims 16 and 20-22 were rejected over McCall in view of Kozyuk. Claim 16, like claims 5 and 15 discussed above, requires that the fluid conduit section have a length less than 5 times the diameter. The Examiner has selected only a portion (one half) of the length of the disclosed conduit 10 described by McCall. The middle of this length, being the mating flanges 16, 18, connect the two halves of the enlarged conduit together. The Examiner apparently proposes to place the valve taught by Kozyuk between the mating flanges. This, of course, would completely destroy the ability of McCall to make the “highly reliable” measurements that the McCall structure was specifically designed to provide. Since this modification would render the McCall invention unsatisfactory for its intended purpose, then there is no suggestion or motivation to make the proposed modification. *In re Gordon, supra*. The Examiner states that he is not using the measurement portion of McCall and therefore the reference is not destroyed. This statement demonstrates that the reference in fact is destroyed in that McCall is all about the measurement portion, and to remove that portion from the base reference for its intended purpose does destroy the base reference and is not permitted in an obviousness rejection.

For at least these reasons, applicant respectfully submits that independent claim 16 is patentably distinguishable over the combination suggested by the Examiner and that claim 16 should be indicated to be allowed, along with its dependent claims 17-22.

Although claims 24-26 have been withdrawn by the Examiner, and have not been specifically addressed by the Examiner with respect to their patentability, applicant submits, as discussed above, that these claims should be reintroduced to the application, and that they should also be indicated as being allowed.

By the present amendment, applicant has submitted new independent claims 27-29.

Independent claim 27 specifically defines that the fluid conduit section, which mounts at a first end directly to an outlet of a pump and at a second end to an inlet of a valve, have a length

less than five times the internal diameter of the conduit. This limitation is discussed above, with respect to claims 5, 15 and 16, and for the same reasons, applicant submits that claim 27 is allowable. Claim 27 also specifies that the fluid conduit section is constructed of a flexible metal material to absorb at least one of shock, vibration and alignment in the pipeline. This limitation is discussed above with respect to claims 1 and 6, and for the same reasons, applicant submits that claim 27 is allowable.

Independent claim 28 specifically defines that the pipeline include an elbow, a pump and a valve, in that order relative to the flow of liquid in the pipeline. The claim specifies that a pump connector having a first end mounted to the pump and a second end mounted to the valve, has a linear fluid conduit section with a length less than five times the internal diameter of the conduit section. This limitation is discussed above, with respect to claims 5, 15 and 16, and for the same reasons, applicant submits that claim 28 is allowable. Claim 28 further specifies that a turbulence reducing device is positioned upstream of the elbow and is arranged to allow fluid flow therethrough and to impart a rotational motion to the fluid, as shown in amended FIG. 1. Applicant submits that such a combination of elements is not shown or suggested in any of the prior art of record, and for this additional reason, claim 28 is allowable.

Independent claim 29 specifically define that the pipeline include an elbow and a pump, with the pump located downstream of the elbow, a turbulence reducing device mounted upstream of the elbow, and being arranged to allow fluid flow therethrough and to impart a rotational motion to the fluid, as shown in amended FIG. 1. Applicant submits that such a combination of elements is not shown or suggested in any of the prior art of record, and that claim 29 is allowable.

Submitted herewith is a declaration of the inventor James Richter, identifying evidence of secondary factors establishing the non-obviousness of the present invention. Specifically, it is a standard of the industry that in a piping system where there is a valve located in a pipeline following a pump, the valve must be separated from the pump by a pipe length of at least 5 to 10

times the diameter of the pipe (see Exhibits 1 and 2). This has been required because the turbulence caused by the pump would damage, destroy, or render ineffective the pipeline or valve if the valve were not separated by a sufficiently long length of pipe to cause the turbulence to dissipate sufficiently. Therefore, just because a builder wanted to save weight or accommodate space considerations, as suggested by the Examiner, shortening the length of pipe between the pump and the valve was previously not permitted or accepted. Applicant's solution allows the valve to be placed substantially closer to the pump, less than five diameters away, directly contrary to the established requirements, overcoming a long-felt need in the industry, allowing for reductions in cost, materials, and excessive space requirements. The length of 5 to 10 times the diameter requirement has been in place for many years and others have failed to come up with a solution to avoid this requirement during that entire time.

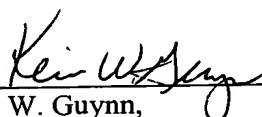
The declaration also establishes the commercial success and acceptance in the industry of the invention, particularly in the selection of the Metraflex CRV® Flex™ device as the first mentioned product showcasing innovation at the industry's primary trade show in January 2005 (see Exhibit 3). The device is described as "a specially designed set of stationary vanes placed in the suction-side pump connector, upstream of an elbow." This statement provides the "nexus" between the innovation and the claimed invention, since these words by a third party veteran of the industry (25+ year show attendee) are virtually identical to those used in claims 24, 28 and 29, defining an aspect of the invention. As a statement of praise by an industry veteran, this is a strong showing of this secondary consideration.

This device also was a Gold winner in the Dealer Design Awards for HVAC Commercial Equipment in 2005 (as shown in Exhibit 4). Again, language similar to the claim language is used to describe this device, demonstrating a nexus between the commercial success, acceptance in the industry, and praise of this device and the claimed invention. The "Case Study" regarding use of the invention at the Indiana University Cyclotron facility (Exhibit 5) also demonstrates the commercial success and acceptance of this invention, particularly from the

statement at the end of the article: "IUCF is so pleased with the performance they are planning to replace their diffuser on the main pump with the CRV® Flex™." These strong secondary considerations clearly demonstrate the non-obviousness of the present invention.

In view of the amended claims submitted herewith and the explanatory comments above, applicant respectfully submits that the rejections set forth by the Examiner have each been addressed and overcome. Applicant requests the Examiner to reconsider the rejections and to indicate all of the claims as allowed.

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